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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|----------------------|------------------|
| 10/709,212 | 04/21/2004 | Qiming Li | 20.2886 | 3211 |
| 23718 | 7590 | 12/07/2006 | EXAMINER | |
| SCHLUMBERGER OILFIELD SERVICES 200 GILLINGHAM LANE MD 200-9 SUGAR LAND, TX 77478 | | | WHITTINGTON, KENNETH | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2862 | |

DATE MAILED: 12/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/709,212 | LI ET AL. | |
| | Examiner | Art Unit | |
| | Kenneth J. Whittington | 2862 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-71 is/are pending in the application.
- 4a) Of the above claim(s) 40-71 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☒ Claim(s) 10-39 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 May 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments filed November 6, 2006, with respect to the rejections of the claims 1-9 under Bittar (US6,476,609) and the combination therewith have been fully considered and are
6 persuasive. Therefore, the rejections have been withdrawn. However, upon further consideration, new grounds of rejection are made in view of Fanini et al. (US2004/0100263), hereafter Fanini, as noted below.

Claim Rejections - 35 USC § 102

12 The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

18 (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the
24 United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-8 are rejected under 35 U.S.C. 102(e) as being anticipated by Fanini. Regarding claim 1, Fanini discloses method and apparatus comprising:

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disposing within a borehole a logging instrument equipped with at least first transmitter and receiver antennas spaced apart by a first distance, at least one of the first antennas having a tilted magnetic dipole with respect to the longitudinal axis of the instrument, the antennas being oriented about the axis of the logging instrument such that the at least one tilted magnetic dipole corresponds to a first azimuthal angle (See Fanini FIG. 1 and see paragraph 0056, note two transmitters and receivers oriented at the x and z directions, see also FIG. 4a for directions of x and z);

azimuthally-rotating the logging instrument within the borehole and while the logging instrument is rotating, activating the first transmitter antenna to transmit electromagnetic energy into the formation; while the logging instrument is rotating (See paragraphs 0062-0069),

directionally measuring the first voltage signals associated with the transmitted electromagnetic energy using the first receiver antenna, as a function of the azimuthal orientation of the logging instrument, so as to determine the azimuthal variation of the measured first voltage signals (See paragraph 0056-0059); and

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fitting the azimuthal variation of the measured first voltage signals to approximate functions (See paragraphs 0067-0075).

Regarding claim 2, the fitting step is executed while the first voltage signals are being measured (See paragraphs 0064-0078, note that the data is fit for each azimuthal sector which is used to geo-steer, which would require real time calculations for steering).

Regarding claim 3, the fitting is stopped when convergence has been achieved (See paragraphs 0064-0075).

Regarding claim 4, the activating, measuring, and fitting steps are repeated to execute subsequent acquisition cycles (See paragraphs 0064-0078, note steps are repeated for each sector).

Regarding claims 5 and 6, the fitting functions are sinusoids defined by coupling components of the first transmitter antenna's magnetic dipole and first receiver antenna's orientation vectors and the coefficients of the fitting components are functions of earth formation parameters including at least one of resistivity of formation beds, location of the logging instrument, borehole deviation, azimuth angle at the location of the logging instrument, and a combination thereof (See paragraph 0056).

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Regarding claim 7, the fitting coefficients include constant, sine, cosine, double angle sin and double angle cosine terms that define an iterative fitting algorithm useful for determining the azimuthal dependence of the directional measurements (See paragraph 0056).

6 Regarding claim 8, the iterative fitting algorithm is used for selected real-time directional measurements having utility in geo-steering (See paragraphs 0064-0078).

Claim Rejections - 35 USC § 103

12 The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

18 Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fanini in view of Minerbo et al. (US 6,304,086), hereinafter Minerbo. Regarding this claim, Fanini teaches the features noted above except for the use of a Fourier transform. Minerbo teaches use of a Fourier transform in induction logging applications (See Minerbo col. 5, line 57 to col. 15, line 38). It would have been obvious to use a Fourier transform in the processing of Fanini. One having ordinary skill in the art would have been motivated to do so to reduce the complexity of equations to a usable form as noted by Minerbo at col. 7, lines 45-49 and further it is well known in the art

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to use a Fourier transform to derive a set of equations with coefficients representing desired characteristics.

Allowable Subject Matter

Claims 10-39 are objected to as being dependent upon a
6 rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: these claims are allowable for the same reasons as contained in the Office Action mailed April 4,
12 2006.

Conclusion

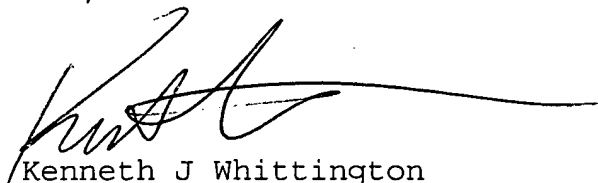
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth J. Whittington whose telephone number is (571) 272-2264. The
18 examiner can normally be reached on Monday-Friday, 7:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571) 272-2180. The fax phone number for the

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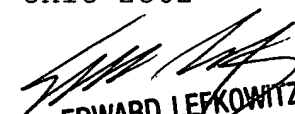
organization where this application or proceeding is assigned is
571-273-8300.

Information regarding the status of an application may be
obtained from the Patent Application Information Retrieval
(PAIR) system. Status information for published applications
6 may be obtained from either Private PAIR or Public PAIR. Status
information for unpublished applications is available through
Private PAIR only. For more information about the PAIR system,
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12 like assistance from a USPTO Customer Service Representative or
access to the automated information system, call 800-786-9199
(IN USA OR CANADA) or 571-272-1000.



Kenneth J Whittington
Examiner
Art Unit 2862

kjw



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SUPERVISORY PATENT EXAMINER
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